

REMARKS

By this Amendment, claims 1 and 3-14 are amended, new claim 16 is added, and claim 2 is canceled, without prejudice to or disclaimer of the subject matter found therein. Accordingly, claims 1 and 3-16 are pending in this application. No new matter is added. Claims 1 and 4 are amended to incorporate the features of original claim 2. All other amendments are made only for clarity and to correct minor informalities. Thus, such amendments do not narrow the claims.

Reconsideration of the application is respectfully requested.

Applicant gratefully appreciates the courtesies shown to Applicant's representative during July 21, 2005 personal interview. Applicant's separate record of the substance of the interview is incorporated into the following remarks.

I. Rejection Under 35 U.S.C. §102(b) and 103(a)

The Office Action rejects claims 1-4, 9 and 11-13 under 35 U.S.C. §102(b) over U.S. Patent No. 6,420,677 to Emer et al. ("Emer"); rejects claims 5, 14 and 15 under 35 U.S.C. §103(a) over Emer in view of U.S. Patent No. 4,808,785 to Vertz et al. ("Vertz"); and rejects claims 6-8 and 10 under 35 U.S.C. §103(a) over Emer in view of U.S. Patent No. 6,307,175 to Blochlinger et al. ("Blochlinger"). The rejection of claim 2 is moot. However, the features of canceled claim 2 are incorporated into independent claims 1 and 14. Applicant respectfully traverses the rejections of claims 1 and 3-15.

As asserted in the personal interview, Emer does not teach or suggest a method of laser drilling including "directing the beam of the laser such that the beam follows a path on at least one side of the hole to drill a diffuser section on at least a beam entry side of the hole with the beam exiting the hole substantially without interference with a remaining non-diffuser part of the hole, wherein the diffuser section is cut with a generally elongate opening

on the beam entry side of the hole, with the beam being inclined with respect to a longitudinal axis of the hole, and with the beam being inclined with respect to an elongate axis of the opening being formed on the beam entry side of the wall such that the beam is directed substantially wholly into an interior of the hole as the beam passes therethrough," as recited in independent claims 1 and 14.

The Office Action asserts that Emer discloses a method of laser machining holes into a hollow gas turbine component forming a metering hole and a diffuser, citing Figs. 1-4, the Abstract, and cols. 2-4. Although the Office Action does not specifically identify how a laser beam is directed in Emer, the Office Action appears to allege that Emer discloses directing the beam of the laser as recited in claims 1 and 14 by rejecting claim 2 over Emer. Applicant respectfully disagrees.

As asserted in the personal interview, Emer teaches a method of controlling a power and pulse width of a laser to penetrate or vaporize a component material to avoid damage to and/or contamination of a metering hole 2 and a wall of a component 6. See Fig. 2, and col. 3, lines 33-37. Initially, first laser beam shots are fired to a shape depth 8 so that the component material is eroded to a shape locus 4, but not substantially beyond. See col. 3, lines 37-47. After the formation of the diffuser 3 opening, Emer teaches that second laser beam shots are fired to form a metering hole 2. See Fig. 2, and col. 3, lines 58-62. The formation of the metering hole 2 is subsequent to the formation of the diffuser 3 opening to avoid damage to the metering hole 2 and contamination or damage to an internal portion of the component 6. See col. 3, lines 62-65.

Because the metering hole 2 does not even exist until after the formation of the diffuser 3 opening, a first laser beam that cuts the diffuser 3 opening exit or pass through the metering hole 2. Thus, the first laser beam that cuts the diffuser 3 opening cannot exit the metering hole 2 substantially without interference with the remaining non-diffuser part of the

metering hole 2 and cannot be directed substantially into an interior of the metering hole 2 as the first laser beam passes therethrough when the diffuser section is cut.

In the method of laser drilling of claims 1 and 14, a laser beam drilling the diffuser exits and passes through a hole without impinging on sides of non-diffuser parts of the hole. Emer does not teach or suggest such features.

As asserted in the personal interview, Blochlinger does not remedy the deficiencies of Emer. Blochlinger teaches a laser-drilling method of producing a noncircular cooling bore 20 of a feed section 22 and a diffuser section 24. See Figs. 1-4. Blochlinger also teaches that the design of the cooling bore 20 geometry, e.g., the sizes of the entry and delivery sections ensure that the feed section 22 is not damaged too severely by a laser beam. See col. 4, line 17-26.

However, Blochlinger only teaches that the diffuser section 24 is cut with the laser beam. See col. 6, lines 40-4. Blochlinger does not teach or suggest inclination of a laser beam with respect to a longitudinal axis 30 of a hole and with respect to an elongate axis, e.g., distance between side surfaces 44, 46, of an outlet 32. Therefore, Blochlinger cannot be reasonably considered to teach or suggest the laser beam being inclined such that the beam is directed substantially wholly into an interior of the feed section 22 as the beam passes therethrough when the diffuser section 24 is cut. Because Blochlinger does not teach or suggest how the laser beam is directed to form the diffuser section 24, one of ordinary skill in laser drilling would not have found it obvious to direct the laser beam and cut the diffuser section as set forth in claims 1 and 14.

As asserted in the personal interview, Vertz also does not remedy the deficiencies of Emer discussed above. Vertz is directed only to a method of making diffused cooling holes in an airfoil using an EDM step. See Abstract.

For at least these reasons discussed above, neither Emer, Blochlinger nor Vertz, alone or in combination, discloses, teaches or suggest the method of laser drilling of claims 1 and 14. Therefore, claims 1 and 14 are patentable over Emer, Blochlinger nor Vertz. Claims 3-13 and 15 variously depend from claims 1 and 14, and thus are also patentable over Emer, Blochlinger nor Vertz for at least the reasons discussed above, as well as for the additional features they recite.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1 and 3-16 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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